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Translation Of  
Process for Post-Treating Washed Textiles for the Purpose  
of Improving the Soil Release

German Patent #28 29 022,

Application Date : July 1, 1978

Issue Date : Jan. 10, 1980

Applicant: Henkel KGaA, 4000 Duesseldorf

Inventors: Jakobi, Guenter, 4010 Hilden; Schmadel, Edmund,  
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Numerous agents for post-treating textiles are known which are used in the final rinse in order to bestow advantageous properties of usage to the textiles. Some of these agents, such as, brightening agents or textile stiffeners, which are capable of being washed out, frequently have "soil-release" properties in addition to their specific action, that is, they prevent soil from being deposited directly on the fiber during usage and, thus, facilitate the dissolving of the soil during the subsequent laundering. However, the soil-release action of these agents is limited.

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On the other hand, agents for treating textiles are known which contain ethoxylated alkylamines as ingredinetes, for example, detergents in which they act as surfactants, skin protective agents or enzyme stabilizers (for example, DE-AS 11 72 791 and DE-OS 26 33 601). However, they are removed in the subsequent post-rinsing process together with the customary ingredients of detergents, so that the soil-release effect cannot be evolved. Described in US #3 790 484 is a perfumed post-rinsing agent which contains polyethoxylated coconut amine as an additional ingredient in addition to brightening quaternary ammonium salts and ethoxylated octyl phenol. However, a relatively highly ethoxylated amine is involved here which possesses no properties improving the soil-release. One such action is usually suppressed by the accompanying substances noted. Moreover, a softening agent for laundry is described in DE-AS 19 29 193 which is used together with detergents and contains a long chain ethoxylated 2-hydroxy alkyl amine with 1 to 2 ethylene glycol ether groups as a brightening component. No soil release action can be evolved in this case either, since the compound is removed during the post-rinsing together with the detergent.

The task of this discovery is to create a process for the soil-release treatment of traditional household laundry which is simple to execute, that is, can be undertaken by the unskilled consumer in conventional automatic washers and exceeds the known post-treatment agents for laundry in its action.

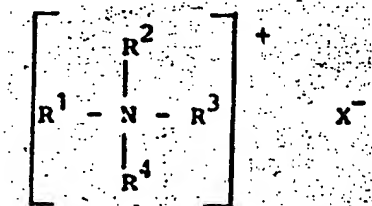
The object of the discovery is a process for post-treating laundered textiles for the purpose of improving the soil-release of soils, characterized by that the washed textiles which are rinsed free of the detergent ingredients are treated in the final rinse with a solution which contains 0.05 to 1 g/l of the water soluble salt of a primary alkyl amine reacted with 2 to 5 moles ethylene oxide and containing 12 to 20 C-atoms in the alkyl portion.

An essential requirement for the success of the treatment of the discovery is the demand that the ethoxylated amine be present as a salt. Surprisingly, amines, which do not have a salt-like bond, have proven to be ineffective. This information is possibly traced back to the high substantivity of the salts for the textile fiber. Ethoxylated amines with a salt-like bond with higher than the degree of ethoxylation specified likewise possess a smaller substantivity and, therefore, are less suitable.

The alkyl chain of the ethoxylated amine is preferably straight-chained or also methyl-branched in the 2-position (oxo portion). Suitable compounds are derived, for example, from natural fatty acids. Examples of this are coconut amine or tallow amine. Especially appropriate are the straight-chain ethoxylated C16-C18 amines with 4-5 ethylene oxide groups. Alkoxyated amines with shorter alkyl chains, for example, C12-C14 coconut amine, preferably exhibit a lower degree of alkoxylation, preferably one of 2-3. The water soluble salts of the ethoxylated alkyl amine, referred to in the following simply as "amine salts", can be present, for example, as salts of hydrochloric acid, hydrobromic acid, sulfuric acid, phosphoric acid, perchloric acid, formic acid, acetic acid, lactic acid, citric acid or another inorganic or organic acid of comparable strength. They are preferably used as hydrochlorides in a concentration of 0.2 to 0.5 g/l.

The agents used for executing the process of the discovery can be concentrated stock solutions with a content of, for example, 3 to 20 percent by weight, especially 5 to 12% by weight, of an ethoxylated amine salt. Such agents can still contain conditioning agents such as organic solvents capable of being mixed with water, for example, ethanol, isopropanol, oligomeric or polymeric ethylene glycol ether as well as ether alcohols in addition to perfumes, preservatives and optical brighteners. Anionic or nonionic surface active or wash active compounds, such as those contained in detergents and cleaning agents usually, stop the soil-release action and, therefore, are not suited to be ingredients contained in the mixture.

In another advantageous form of execution, the process can also be executed in the presence of brightening agents or laundry stiffeners. Treatment solutions which have a brightening effect additionally contain 0.1 to 0.3 g/l of a higher molecular weight quaternary ammonium salt, especially of the following formula:



in which  $R^1$  and  $R^2$  are saturated, predominantly linear alkyl portions with 12 to 20, preferably 16 to 18 C-alkyl portions,  $R^3$  is a  $C_1$  to  $C_3$  alkyl portion,  $R^4 = R^3$  or is a  $\beta$ -hydroxy alkyl portion and  $X^-$  is the anion of an inorganic or organic acid.

The stiffening agent can consist of traditional stiffening high polymers of natural or synthetic origin and be present in the treatment solution in a concentration of 0.3 to 2 g/l. The stiffening agent preferably consists of a vinyl acetate-crotonic acid copolymer which is soluble in alkali washing liquors. Such stiffening agents are described, for example, in DE-PS 1 278 336.

The addition of amine salt to the brightening or stiffening treatment baths does not prevent their softening or stiffening action, but leads to improved soil-release in the subsequent washing treatment. This property is, of course, less strongly expressed in combinations with brightening agents and especially in stiffening agents than when using pure amine salt solutions, since the post-treatment agents involved already possess a true soil-release action in themselves alone.

#### EXAMPLES

Washed textile samples of mixed fabrics (65% polyester, 35% finished cotton) were treated in the final rinse of a domestic washing machine with a series of post-treatment agents for laundry, subsequently spinned and dried. For the purpose of soiling them, they were sprayed in aqueous suspension with a solution of dirt containing skin fat, kaolin, iron oxide black, iron oxide yellow and soot under reproducible conditions and subsequently dried at 125°C. The samples (200 g) were washed together with 1 kg of clean fill wash in a programmed domestic washing machine using a marketed detergent (7g/l, liquor ratio 1:16) at 60°C. The degree of whiteness of the samples was determined photometrically. The results (averages from 10 determinations) are summarized in the following Table 1.

TABLE 1			
Example	Conc. g/l	Active	Degree of Whiteness %
1	0.24	C16 to C18 tallow amine & 5 EO · HCl	69.2
2	0.30	C12-C14 coconut amine & 2 EO · HCl	63.8
3	0.24	C14-C16 alkyl amine & 4 EO · HCl	68.8
-	-	nothing added	54.0

In the following examples the ethoxylated amine salts were used together with a brightening agent as well as a laundry stiffening agent. The agents were composed as follows (information in % by weight).

TABLE 2

	Brightener		
	I	II	III
dimethyl-ditallow alkyl ammonium chloride	5	5	5
tallow amine & 5EO·HCl	8	-	-
coconut amine & 2EO·HCl	-	8	-
polyethylene glycol (MW=400)	0.65	0.65	0.65
formalin (preservative)	0.2	0.2	0.2
water	rest	rest	rest

TABLE 3

	Stiffening Agent	
	I	II
vinyl acetate-crotonic acid copolymer	20	20
polyacrylamide (emulsion stabilizer)	3	3
tallow amine & 5EO·HCl	15	-
polyethylene glycol (MW=400)	2.5	2.5
sodium fluoride (preservative)	2.5	2.5
water	rest	rest

Washed textile samples corresponding to Examples 1 to 3 were post-treated, as described elsewhere, in the final rinse with a solution which always contained 3 g/l of the brightener and stiffening agent noted previously. The results noted in Table 4 were obtained after the soiling and washing corresponding to the information in Examples 1 to 3.

TABLE 4

Example	Conc. g/l	Agent	Degree of Whiteness %
4	3	birghtener I	67.4
5	3	brightener II	67.1
-	3	brightener III	60.0
6	3	stiffening agent I	61.4
-	3	stiffening agent II	58.9
-	-	nothing added	54.0

The results show that the ethoxylated amine salts improve even further the soil-release capability of the textile samples treated with a brightener or stiffening agent.

(Translator's note: The claims to this patent were translated previously and are attached to this translation of the remaining text.)

Translated by  
*Barbara R. Koch*  
 Barbara R. Koch, 9/18/80

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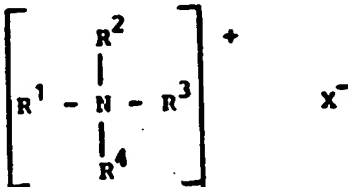
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PATENT CLAIMS

1. Process for post-treating washed textiles for the purpose of improving the soil release, characterized by that the washed textiles, which are rinsed free of the detergent ingredients, are treated in the final rinse with a solution which contains 0.05 to 1 g/l of the water soluble salt of a primary alkyl amine reacted with 2 to 5 moles ethylene oxide and which has 12 to 20 C-atoms in the alkyl portion.
2. Process conforming to Claim 1, characterized by that the treatment is carried out with a solution of the ethoxylated amine salt in which the amine salt has 12-14 C-atoms and 2-3 ethylene glycol ether groups.
3. Process conforming to Claim 1, characterized by that the treatment is carried out with a solution of the ethoxylated amine salt in which the salt has 16-18 C-atoms and 4-5 ethylene glycol ether groups.
4. Process conforming to Claims 1 to 3, characterized by that the treatment is carried out with a solution which contains 0.2 to 0.5 g/l of the ethoxylated amine salt.
5. Process conforming to Claims 1 to 4, characterized by that the treatment is carried out with a solution which additionally contains 0.1 to 0.3 g/l of a brightening quaternary ammonium salt.
6. Process conforming to Claim 5, characterized by that the a quaternary ammonium salt of the following formula is used:



in which  $R^1$  and  $R^2$  signify saturated, preponderantly linear alkyl portions with 12-20, preferably 16-18 C-alkyl portions,  $R^3$  signifies a  $C_1$ - $C_3$  alkyl portion,  $R^4 = R^3$  or a  $\beta$ -hydroxy alkyl portion and  $X^-$  signifies the anion of an inorganic or organic acid.

7. Process conforming to Claims 1 to 4, characterized by that the treatment is carried out with a solution which contains additionally 0.3 to 2 g/l of a stiffening agent.

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8. Process conforming to Claim 7, characterized by that the stiffening agent consists of a vinyl acetate-crotonic acid copolymer which is soluble in alkali reacting washing liquors.

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*Barbara R. Koch*  
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June 24, 1980

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Soil-release rinsing of washed textiles - with soln. contg. ethoxylated amine salt and opt. quat. amine salt finish and polymer stiffener

Washed textiles, rinsed free from detergent components, are treated with a last rinsing soln. contg. 0.05-1 (0.2-0.5) g/l water-soluble salt, (I), of a prim. 12-20 C alkylamine ethoxylated with 2-5 mol ethylene oxide. Pref. amine salts contain 12-14 C and 2-3 ethylene glycol ether gps. or 16-18 C and 4-5 ethylene glycol ether gps.

#### ADVANTAGE

(I) have soil-release properties and do not affect other finishes, e.g. brighteners and starches. The soil-release treatment can take place in domestic washing machines.

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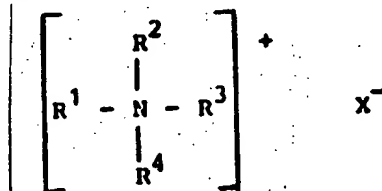
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5. Process conforming to Claims 1 to 4, characterized by that the treatment is carried out with a solution which additionally contains 0.1 to 0.3 g/l of a brightening quaternary ammonium salt.
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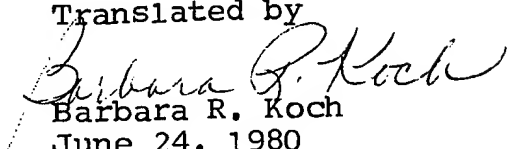
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